

TREK

PLAYBACK

USER GUIDE



June 2017

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TABLE OF CONTENTS

<u>PARAGRAPH</u>	<u>PAGE</u>
1 Welcome.....	1
1.1 Getting Started	1
2 Technical Support.....	1
3 Introduction.....	1
4 Overview of the User Interface	2
4.1 Main Window	2
4.2 Menus.....	3
5 Quick Start Guides	3
5.1 How to Configure the Playback	3
5.2 How to Activate a Playback	4
5.3 How to Deactivate a Playback	4
6 Details.....	4
6.1 Configure Dialog.....	4
6.1.1 <i>Configure Dialog (Playback Tab)</i>	5
6.1.2 <i>Configure Dialog (Forward Tab)</i>	9
6.2 Statistics	11
6.2.1 <i>Configure Statistics Dialog</i>	17
6.3 Application Messages	22
6.4 Application Configuration File	23
6.5 Application Settings	24
7 FAQ and Troubleshooting	24

FIGURES

<u>FIGURE</u>	<u>PAGE</u>
Figure 1 Main Window	2
Figure 2 Configure Dialog.....	5
Figure 3 Configure Dialog (Playback Tab)	6
Figure 4 Files.....	7
Figure 5 Configure Dialog (Forward Tab)	9
Figure 6 Forward Tab Populated	10
Figure 7 Forward Tab Transform Tab	11
Figure 8 Statistics in the Main Window	12
Figure 9 Statistics Dialog	12
Figure 10 Statistics Pop-Up Menu.....	13
Figure 11 Device Statistics View	14
Figure 12 Device and Packet Statistics.....	15
Figure 13 Snapshot Statistics.....	16
Figure 14 Debug Statistics View	16
Figure 15 Configure Statistics Dialog	17
Figure 16 Configure Statistics Dialog	18
Figure 17 Messages Dialog	22
Figure 18 Configure Messages Dialog	23
Figure 19 Clear Messages Dialog.....	23

1 Welcome

The Telescience Resource Kit (TReK) is a suite of software applications and libraries that can be used to monitor and control assets in space or on the ground.

The TReK Playback application provides the capability to play back data stored in data recording files.

The topics in this user guide require an understanding of the topics covered in the TReK Concepts document. Please be sure you have read the TReK Concepts document before reading this user guide.

1.1 Getting Started

Start with the Introduction which provides an application overview. Next, try the Quick Start Guides for “How Tos” for common functions. For help with details, reference the Details section. See the FAQ and Troubleshooting section for helpful hints and solutions to the common “gotchas”.

2 Technical Support

If you are having trouble installing the TReK software or using any of the TReK software, please contact us for technical assistance:

TReK Help Desk E-Mail, Phone & Fax:

E-Mail: trek.help@nasa.gov
Telephone: 256-544-3521 (8:00 a.m. - 4:00 p.m. Central Time)
Fax: 256-544-9353

If you call the TReK Help Desk and you get a recording please leave a message and someone will return your call. E-mail is the preferred contact method for help. The e-mail message is automatically forwarded to the TReK developers and helps cut the response time. The HOSC Help Desk (256-544-5066) can provide assistance as needed and is available 24x7.

3 Introduction

The TReK Playback application provides the capability to play back data stored in data recording files and forward the data. The TReK Data application can be used to receive the forwarded data and perform any of the functions available in the data application such as processing the data and displaying it. The configuration of the TReK Playback application can be saved.

4 Overview of the User Interface

4.1 Main Window

The main window is shown in Figure 1. The main window consists of two areas. The top part of the main window contains statistics information about the playback in progress. It will be empty until a playback is started. The bottom part of the window is a message area that is used to display important status and information messages about the activities in progress.

The Message Area is a dock window that you can float or dock. To float a dock window, use your left mouse button to click and hold the title area while dragging the window to another area of the screen. To dock, use the title bar to drag the dock window over the main window and drop.

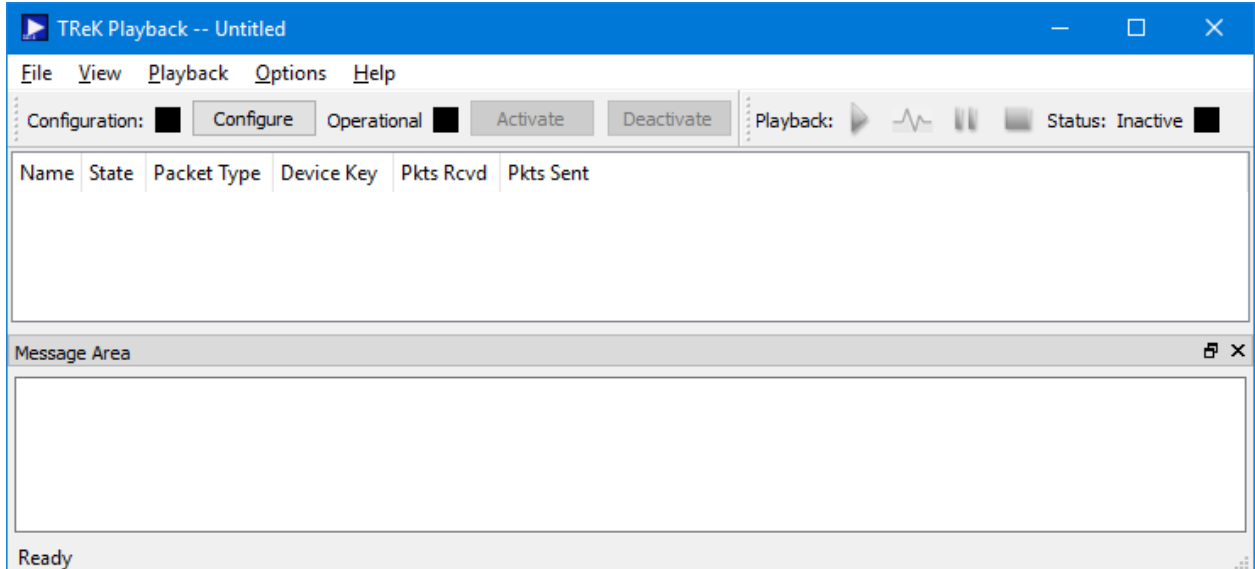


Figure 1 Main Window

Configuration Toolbar

The Configuration toolbar provides the capability to configure the playback, Activate the playback, and Deactivate the playback.

Playback Toolbar

The Playback toolbar provides access to the playback controls. The control buttons provide the capability to Start, Pulse, Pause, or Stop a playback. The Status area to the right of the controls displays the status of the playback.

Statistics Area

The Statistics area provides real time statistics information for active services.

Message Area

The Message Area displays important information, warning and error messages. The message area can be cleared using the View menu.

4.2 Menus

The application menus are: File, View, Playback, Options, and Help. Each of these menus is described in more detail below.

File Menu

The File menu provides the capability to create a new configuration, open a configuration, save a configuration, and exit the application.

View Menu

The View menu provides the capability to clear the main window message area and show and hide the statistics area and the main window message area.

Playback Menu

The Playback menu provides the capability to configure, activate, and deactivate a playback. Once a playback has been activated, the Playback menu will also display menu items to control the playback.

Options Menu

The Options menu provides the capability to access statistics and reset statistics. It also provides access to the Messages dialog which can be used to display and filter application messages.

Help Menu

The Help menu provides access to on-line help and application version information.

5 Quick Start Guides

This section provides “How Tos” for common functions.

5.1 How to Configure the Playback

This section describes how to configure the application to play data back from recorded data files. For additional information and details about the Configure dialog please reference section 6.1.

1. To configure a playback push the Configure button.
2. In the configure dialog use the Playback tab to add one or more recorded data files. Update other playback configuration information such as Playback Order, Playback Rate, or Playback Mode as needed.

3. In the Configure dialog use the Forward tab to enter one or more destinations for the data to be played back.
4. Push the Ok button to complete the configuration. The Configuration status should turn green.

5.2 How to Activate a Playback

This section describes how to activate a playback. A playback must be configured in order to activate it.

1. To activate a playback push the Activate button.

5.3 How to Deactivate a Playback

This section describes how to deactivate a service. A playback must be activated in order to deactivate it.

1. To deactivate a playback, push the Deactivate button.

6 Details

This section covers various application details.

6.1 Configure Dialog

The Configure dialog is used to configure a playback. The Configure dialog is shown in Figure 2. Details are provided below.

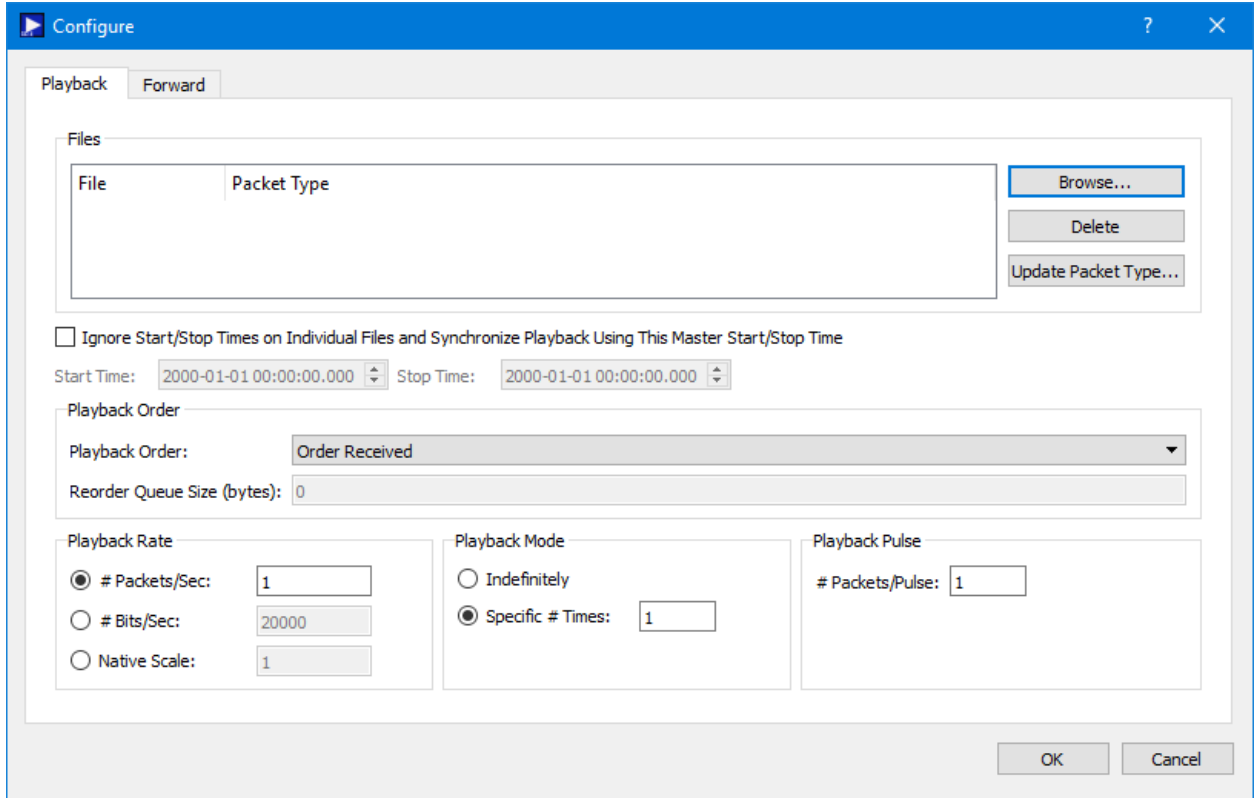


Figure 2 Configure Dialog

There are two tabs in the Configure dialog: Playback and Forward. The Playback tab is used to configure the playback and the Forward tab is used to configure data forwarding information. Details on each tab are provided below.

6.1.1 Configure Dialog (Playback Tab)

The Configure Dialog Playback tab is shown in Figure 3.

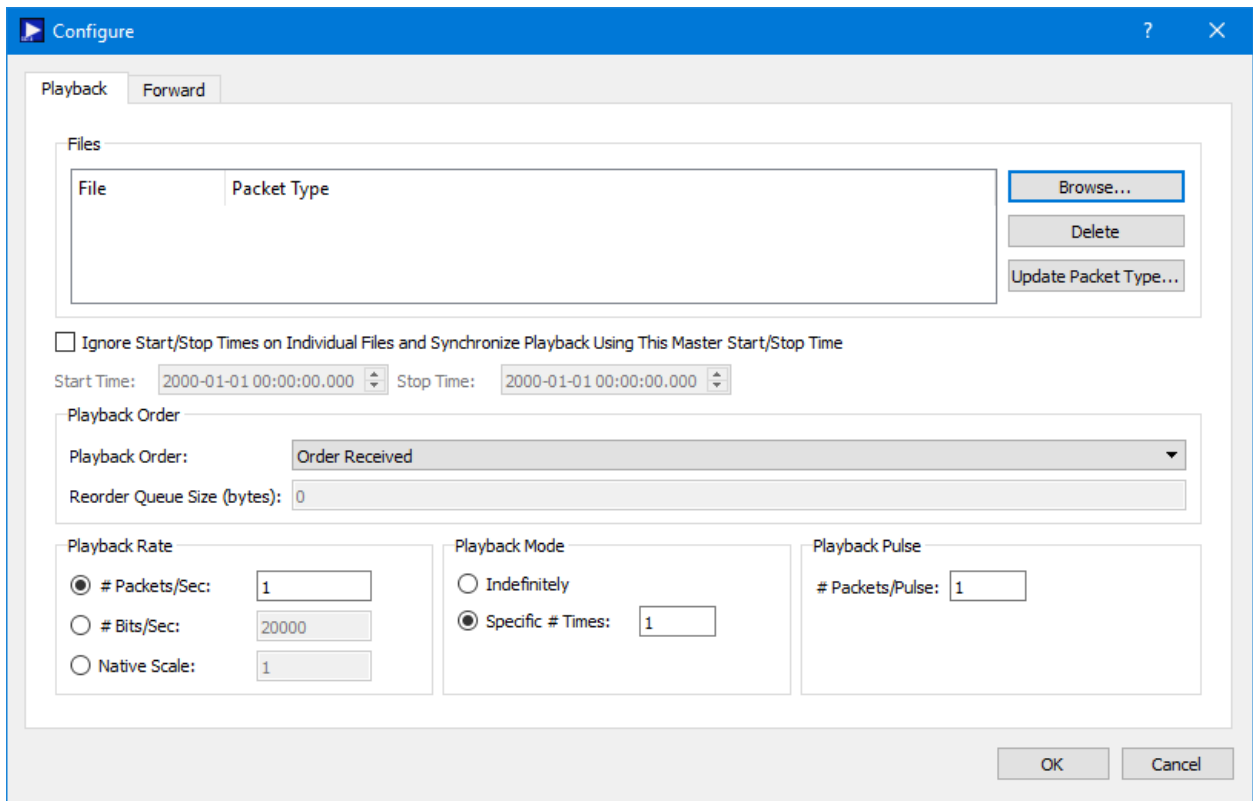


Figure 3 Configure Dialog (Playback Tab)

The Playback tab is used to enter information about the playback. The fields are described below.

Files

Files containing recorded data can be identified by browsing for the files and adding them to the list. The Browse button will display an Open dialog which can be used to select one or more files and add them to the list. Figure 4 shows the Files list after a single recorded data file was selected and added to the list. The Delete button can be used to delete one or more files from the list. If the directory containing the recorded data file does not have an associated configuration file describing the recorded data file's format, the Packet Type will show "Unknown" when the recorded data file is added to the list. If this occurs, the Update Packet Type button can be used to identify the type of data in the recorded data file(s) selected. The Playback library identifies configuration files, in a record file directory, by the file name which is a combination of the record file's base file name with a ".con" extension. The configuration file associated with a record file uses a packet header processor template to record information on how to determine the length, packet sequence count and embedded time of each recorded packet.

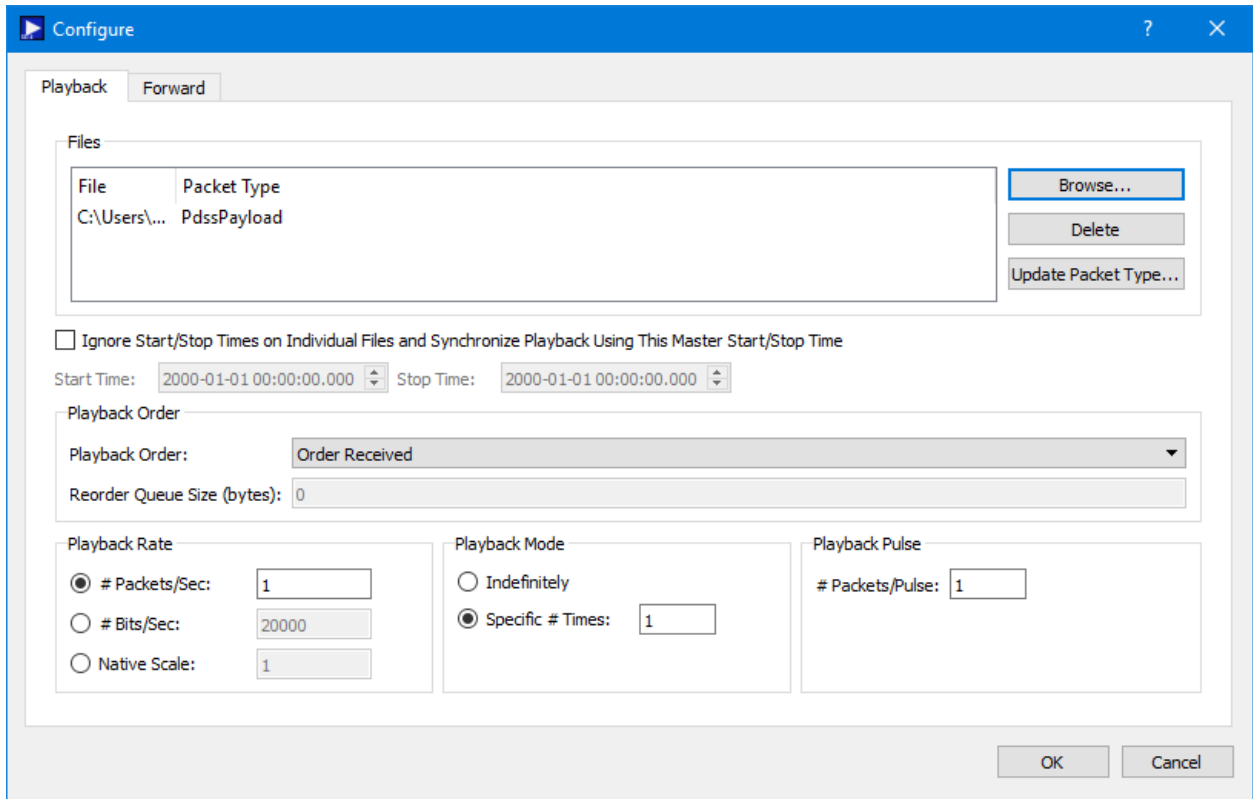


Figure 4 Files

Ignore Start/Stop Times on Individual Files and Synchronize Playback Using This Master Start/Stop Time

The default configuration for a playback will play back the recorded data one file at a time. If this checkbox is checked, the playback will be ‘synchronized’ such that the data in the total set of recorded data files will be playback based on time and not based on individual files.

Start Time

The Start Time for the synchronized playback.

Stop Time

The Stop Time for the synchronized playback.

Playback Order

There are three options for Playback Order. Each is described below:

Order Received

Order Received will playback files in the order they were added to the list and playback packets in the files in the order they were recorded in the file.

Reorder Using Embedded Time

Reorder Using Embedded Time will playback packets from the playback files in time order using the embedded time stamp in the individual packets. A reorder queue is required if packets in the individual playback files are out of order. The reorder queue must be sized to hold the maximum sequence of out of order packets in the playback files or the packets will not be reordered correctly. For example, packets A,B,C,D,M,N,O,E,F,G,H,I,J,K,L,P,Q,R in a file would require a reorder queue size of four to produce the proper packet sequence of A,B,C,D,E,F,G,H,I,J,L,K,M,N,O,P,Q,R.

Reorder Using Embedded Time And Remove Duplicates

Reorder Using Embedded Time will playback packets from the playback files in time order using the embedded time stamp in the individual packets. Duplicate packets will not be played back. Duplicate packets are identified using the packet's embedded time and sequence count. A reorder queue is required if packets in the individual playback files are out of order or contain duplicate packets. The reorder queue must be sized to hold the maximum sequence of out of order packets or duplicate packets or the packets will not be played back correctly. For example, packets A,B,C,D,M,E,F,G,H,I,J,K,L,M,N,O,P,Q,R in a file would require a reorder queue size of two to produce the proper packet sequence of A,B,C,D,E,F,G,H,I,J,L,K,M,N,O,P,Q,R.

Reorder Queue Size

Reorder Queue Size is the size of the queue used to reorder the packets in a playback file. Doubling the maximum packet sequence error associated with the playback file is a method that may be used to estimate a reorder queue size. If the reorder queue size is too small, packets will not be reordered in the proper sequence. If the reorder queue size is too large, CPU will be taxed unnecessarily.

Playback Rate

There are three options for playback rate. Each are described below:

Packets/Sec

Packets per Second will be play the recorded data back using the # packets per second rate entered.

Bits/Sec

Bits per Second will be play the recorded data back using the # bits per second rate entered.

Native Scale

Native Scale will play the recorded data back at a specified multiple of the packet's native rate. Native rate is determined by the embedded time stamp associated with each packet

Playback Mode

The playback can be configured to play back indefinitely or a specific number of times. If the playback is set to 'Indefinitely' the playback will continue to replay the playback

until the playback is stopped using the Stop Playback command. If it is set to Specific # Times, the playback will be run the specific number of times identified.

Playback Pulse

When the playback is pulsed, the # packets sent per pulse is defined by this entry.

6.1.2 Configure Dialog (Forward Tab)

The Configure Dialog Forward tab is shown in Figure 5. This tab is used to identify one or more destinations the recorded data being playback should be sent.

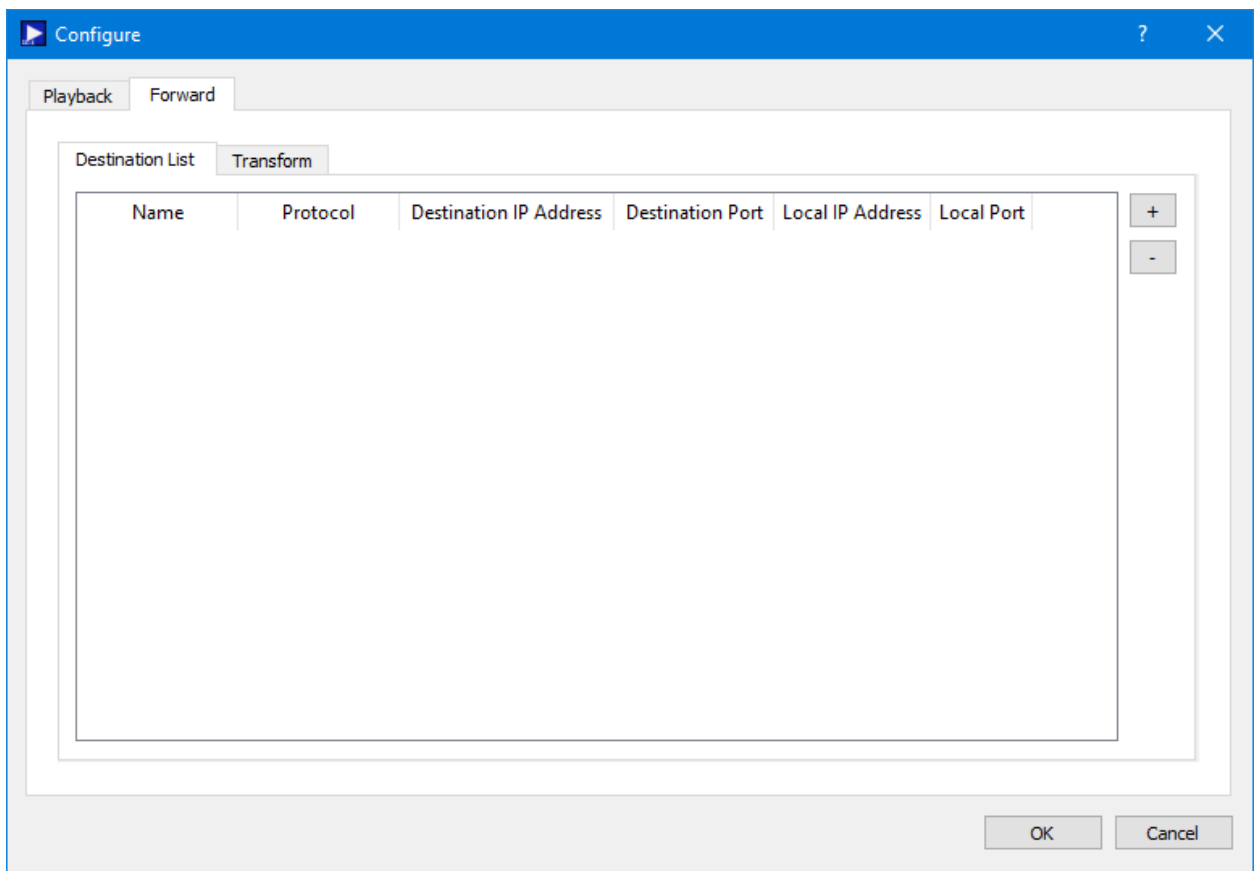


Figure 5 Configure Dialog (Forward Tab)

Destination List

The destination list is used to identify the list of destinations to which the data should be forwarded. Each destination must include a user defined name that is unique in this destination list, a Protocol, and the applicable settings required for the protocol selected. The Protocols supported are UDP and TCP. The Protocol menu provides the capability to select the type of socket to use when forwarding the data: UDP, TCP Client, or TCP Listener socket. Figure 6 shows three different destinations in the Destination list.

When using a TCP Listener socket it is not necessary to define a Destination IP Address or a Destination Port. When the Local Port is set to 0, the operating system will automatically select a port to use for the socket that is created to send data to the destination. This is the default as it saves you the trouble of keeping up with ports. However, you can enter a specific port if you would like. The + and - buttons are used to add a row to the list and delete a row from the list respectively.

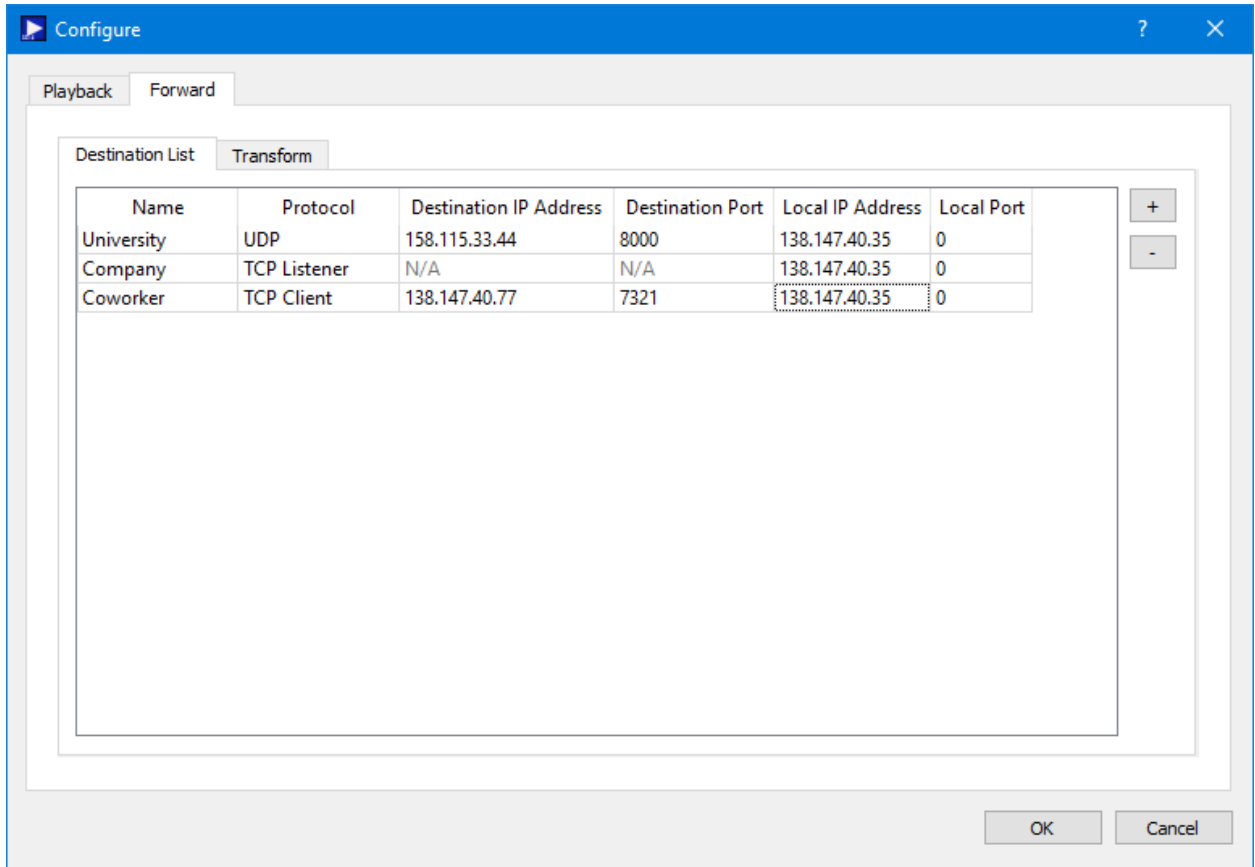


Figure 6 Forward Tab Populated

The Transform tab is shown in Figure 7. The Transform tab provides the capability to enable the transform feature which can be used to remove a specific number of bytes from the beginning of each packet before the packet is forwarded.

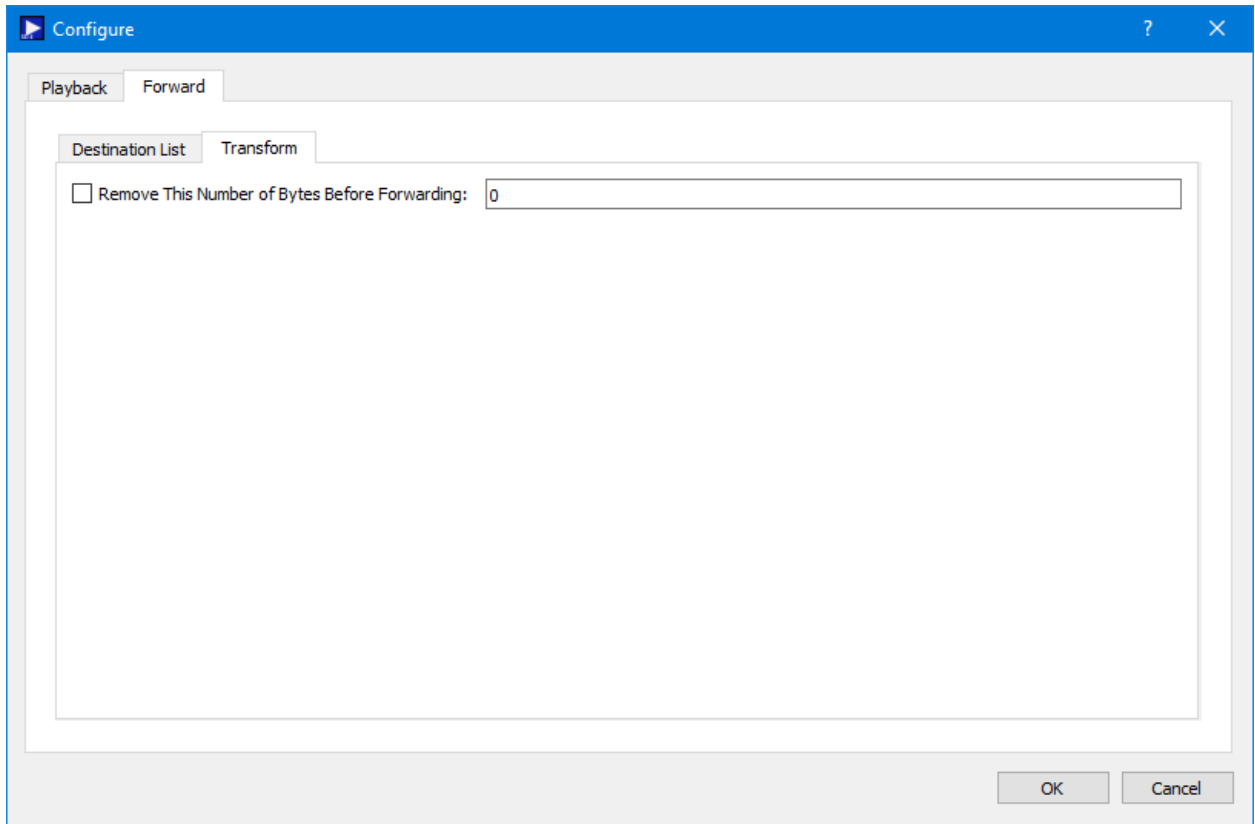


Figure 7 Forward Tab Transform Tab

6.2 Statistics

Statistics displays statistics information as the data playback is in progress. Statistics information is displayed in the Main Window and in the Statistics dialog available from the Options menu. Figure 8 shows the Statistics area in the Main Window. Figure 9 shows the Statistics dialog.

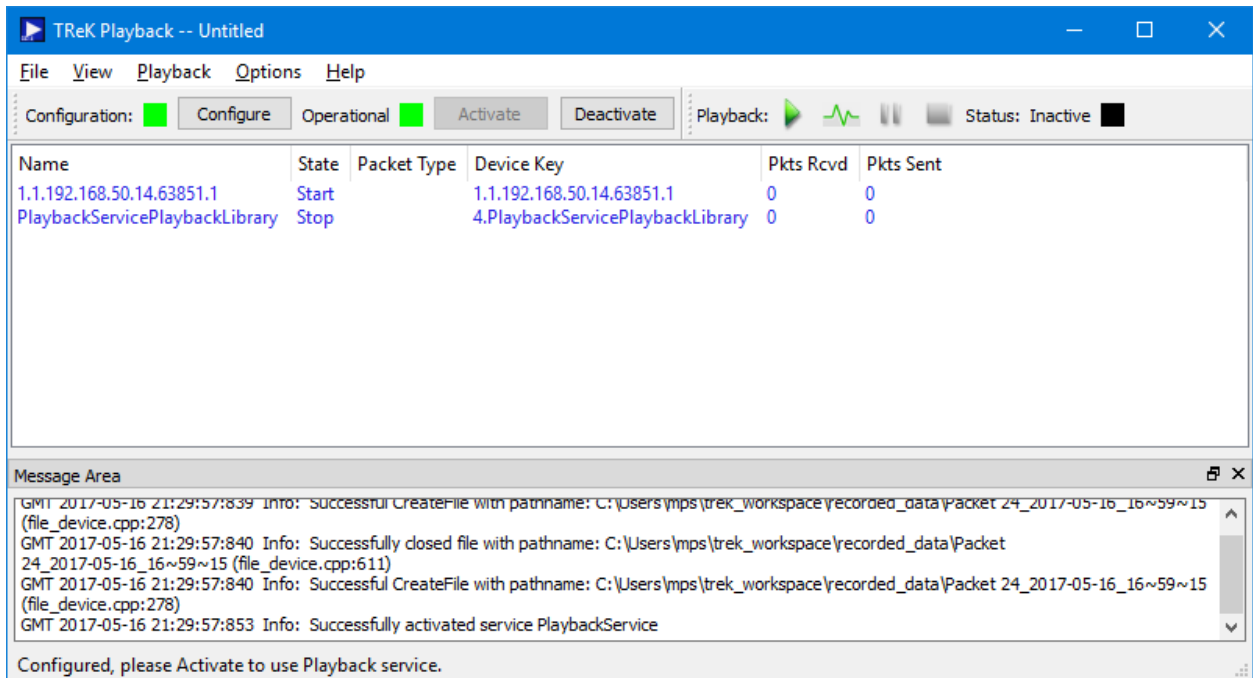


Figure 8 Statistics in the Main Window

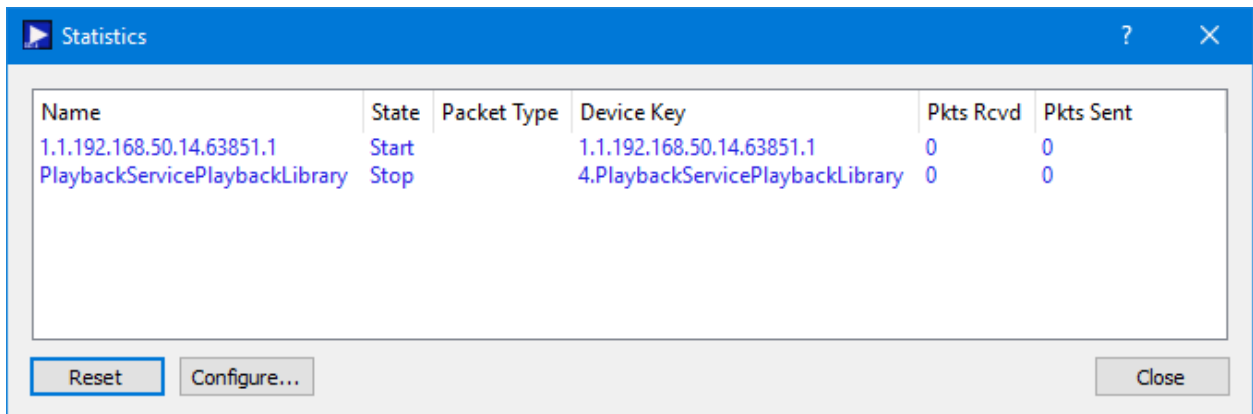


Figure 9 Statistics Dialog

Statistics can be configured to display different views of the statistics information. The view options can be accessed using the Statistics area pop-up menu. The pop-up menu is shown in Figure 10 and can be accessed by clicking the right mouse button in the statistics area.

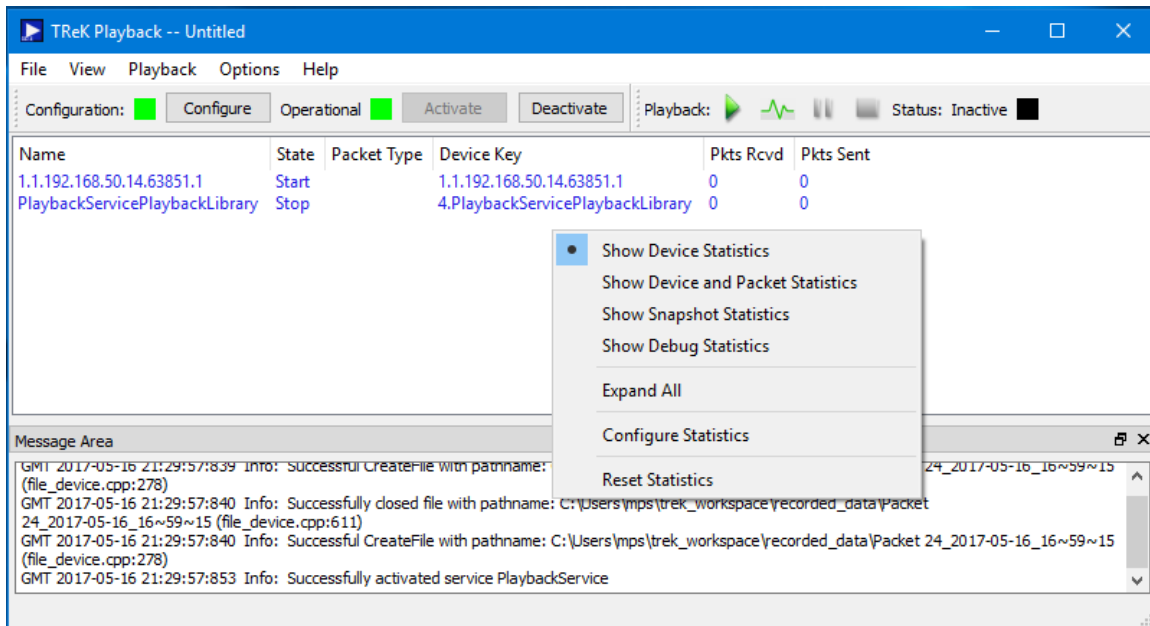


Figure 10 Statistics Pop-Up Menu

The Statistics pop-up menu has several options. Each is described below:

Show Device Statistics

Device Statistics is the default view. Device Statistics displays all the network sockets or devices in use by the playback. When the device is a network socket it will include the IP address and Port. When the device is a library device that performs a specific function such as the playback, the name will reflect the device's function. Figure 11 shows the device statistics view. In this example, there is one network socket displayed. This socket is used to forward the data. When the playback is active, the Pkts Sent column will update reflecting the number of packets sent. The PlaybackServicePlaybackLibrary line item represents the device used to perform the playback. When the playback is active, the Pkts Sent column will update reflecting the number of packets played back.

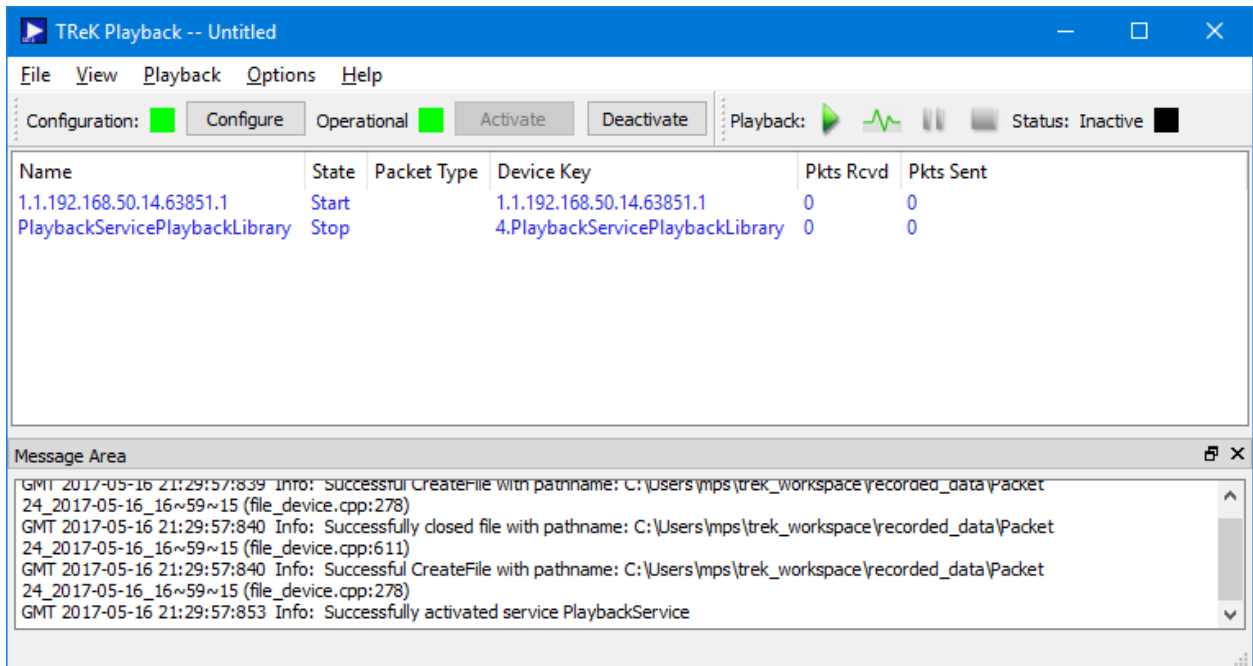


Figure 11 Device Statistics View

Show Device and Packet Statistics

The Device and Packet Statistics option will display both device statistics and packet statistics. Figure 12 shows the device and packet statistics view expanded. In this view you can see this playback was configured to play back recorded data with multiple packet keys. When this data is played back the Pkts sent column will update reflecting the number of packets played back and the number of packets forwarded for each device and packet key.

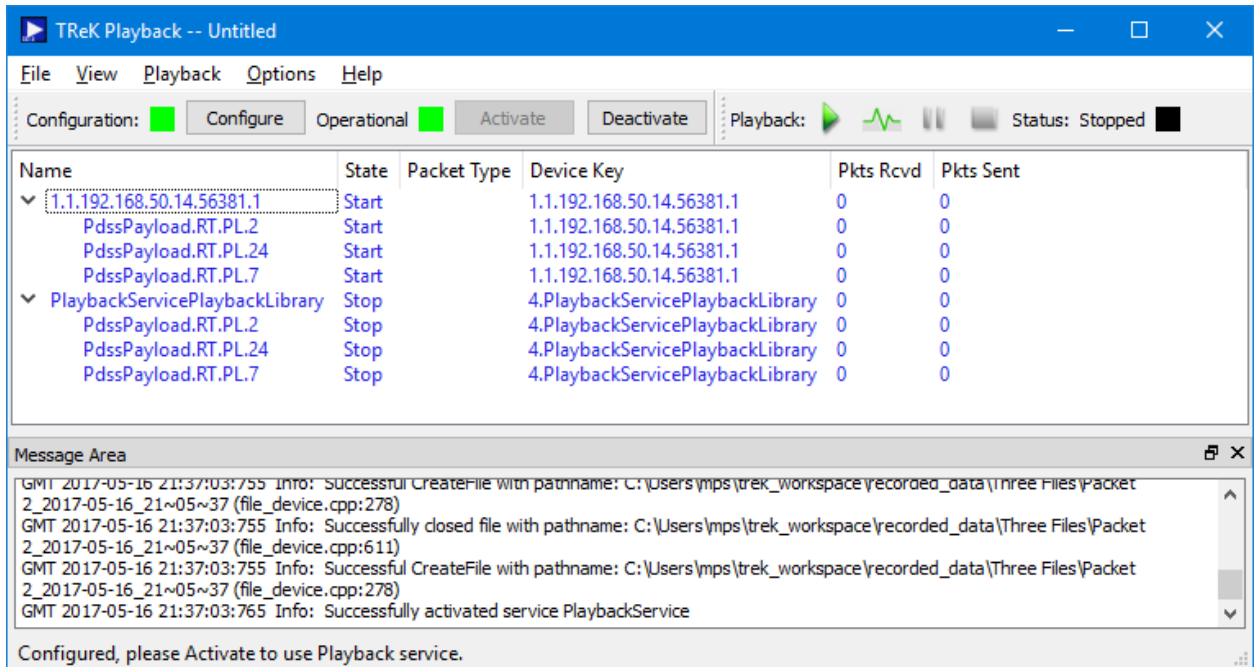


Figure 12 Device and Packet Statistics

Show Snapshot Statistics

Figure 13 shows the Snapshot view. This view provides a snapshot of the current state of the packets being played back. In Figure 13 you can see two packets are blue and one packet is green. Blue indicates the playback is configured to play the packet back but it is not currently being played back. Green indicates the packet is being played back.

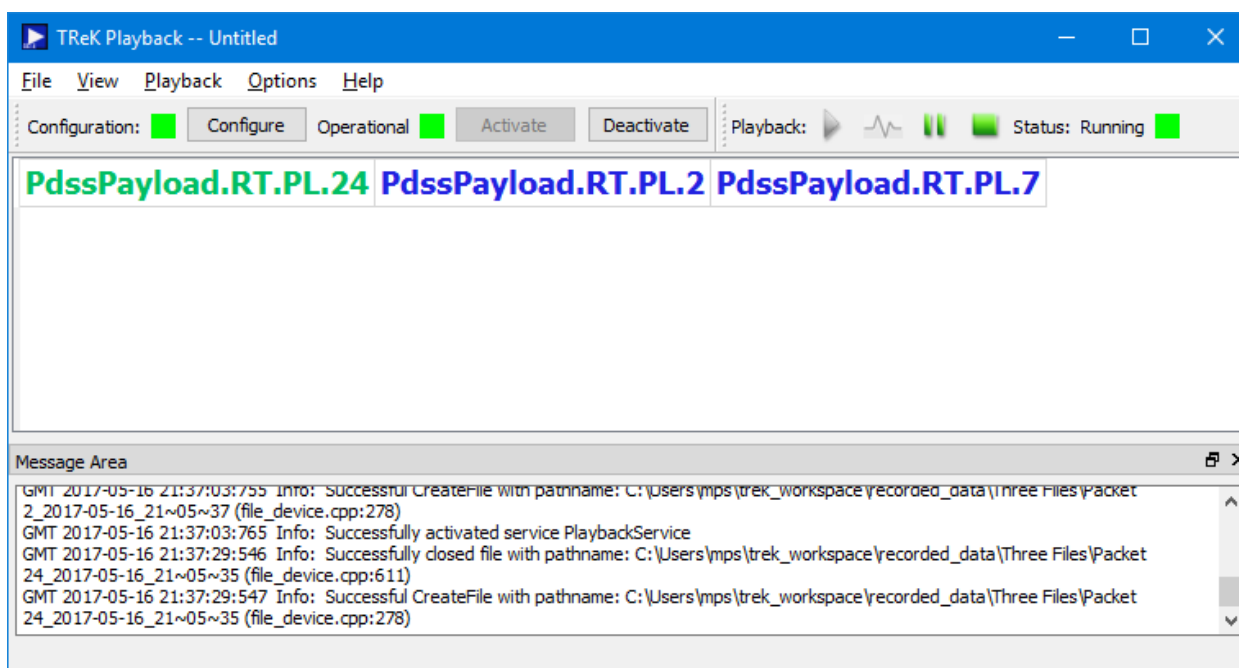


Figure 13 Snapshot Statistics

Show Debug Statistics

The Debug Statistics view shows the most detailed information of all the various views. It shows device statistics and packet statistics for the playback. The Debug Statistics View is shown in Figure 14.

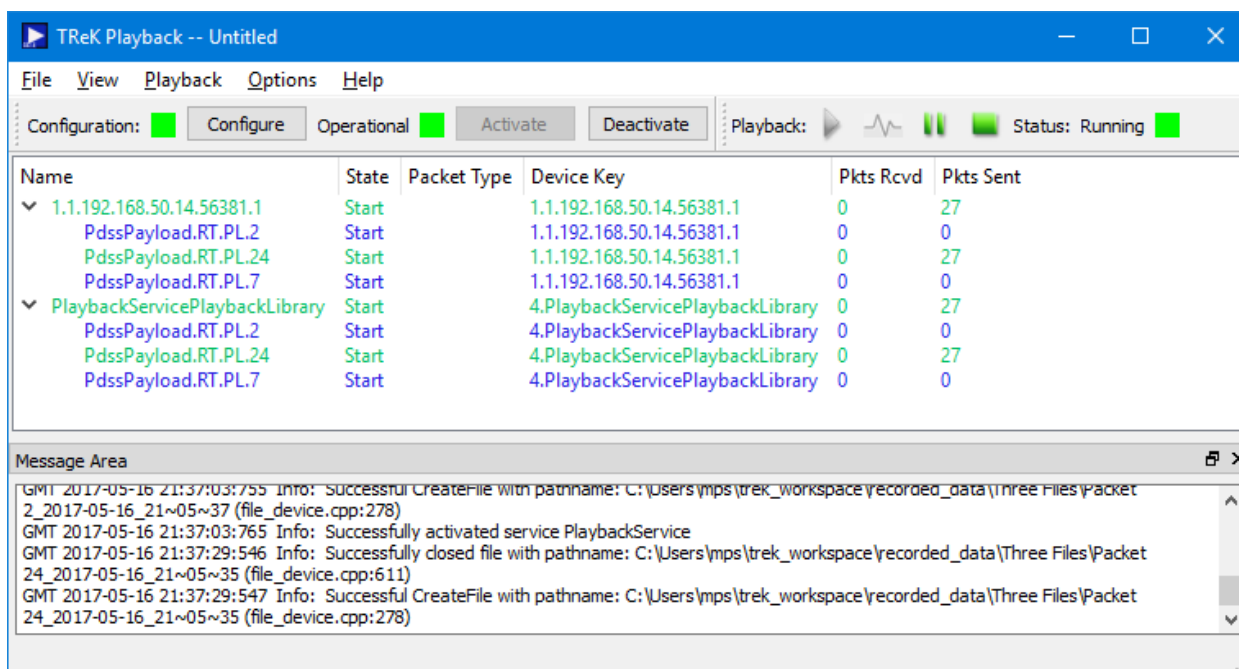


Figure 14 Debug Statistics View

Expand All

The Expand All option will expand the Statistics tree to show all items. The Statistics tree will only appear for views that show packet statistics such as the ‘Device and Packet Statistics’ view and the “Debug Statistics’ view.

Configure Statistics

The statistics information displayed can be configured using the Configure Statistics dialog. This dialog can be accessed using the statistics pop-up menu or the Configure button in the Statistics dialog. The Configure Statistics dialog is shown in Figure 15. Detailed information is covered in section 6.2.1.

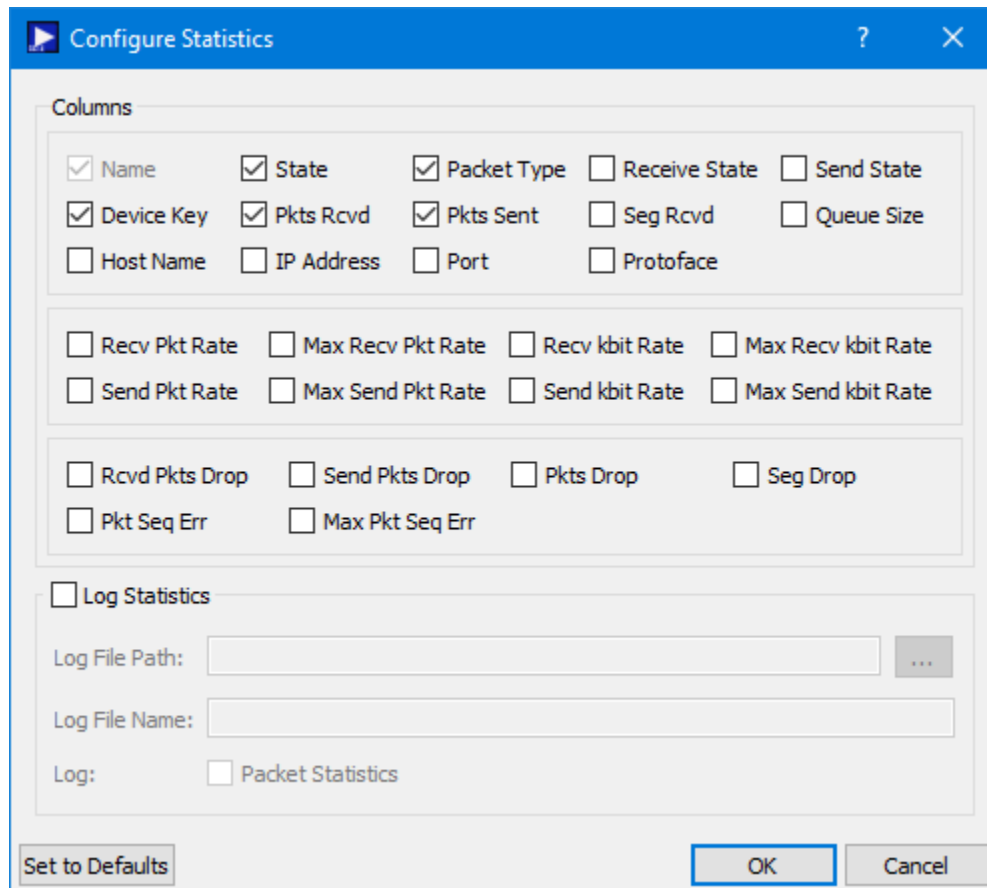


Figure 15 Configure Statistics Dialog

Reset Statistics

Reset Statistics will reset all statistics in all views to zero.

6.2.1 Configure Statistics Dialog

The Configure Statistics Dialog is shown in Figure 16.

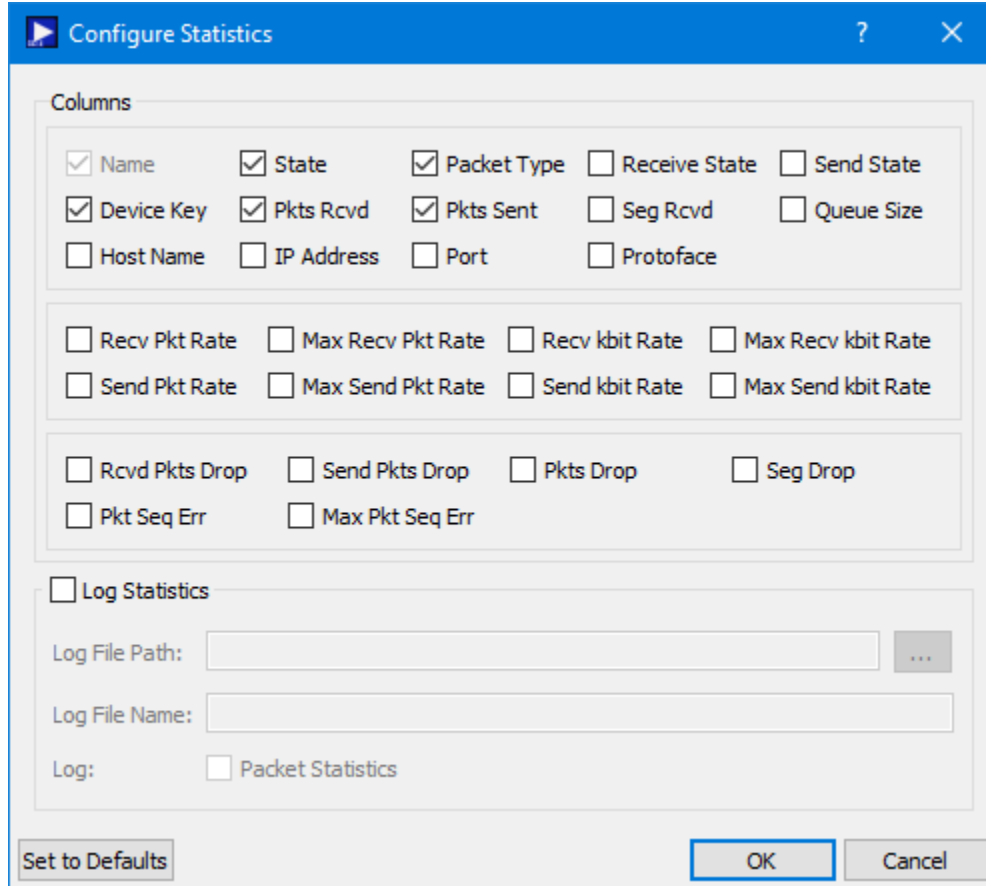


Figure 16 Configure Statistics Dialog

Each field is described below.

Name

Name is a character string that uniquely identifies each device and packet type. The device name is the device key if no device name is provided when the device is created. The packet name is the packet key associated with the packet.

State

State is the current state or condition of a device. Valid states include Start, Stop, Pause, Pulse, Ready and Undefined. If you check the State checkbox, the State column will be displayed.

Packet Type

Packet Type is a character string identifying the configuration of a device's packet header processor. If a device does not have to have an associated packet header processor, the Packet Type column is blank. Packet header processors process individual fields in the

packet header producing packet keys. If you check the Packet Type checkbox, the Packet Type column will be displayed.

Receive State

Receive State is the current receive state of an object. Valid receive states include Ready To Receive, Receiving and Not Receiving. If you check the Receive State checkbox, the Receive State column will be displayed.

Send State

Send State is the current receive state of an object. Valid receive states include Ready To Send, Sending and Not Sending. If you check the Send State checkbox, the Send State column will be displayed.

Device Key

Device Key is a character string that uniquely identifies each device. If you check the Device Key checkbox, the Device Key column will be displayed.

Pkts Rcvd

Packets received represents the number of packets received. If you check the Pkts Rcvd checkbox, the Pkts Rcvd column will be displayed.

Pkts Sent

The number of packets sent to a destination. If you check the Pkts Sent checkbox, the Pkts Sent column will be displayed. Pkts Sent is not the same as packets forwarded. Pkts Sent is used to represent the number of packets sent across a socket that is configured to receive and send packets. Pkts Sent never indicates packets forwarded. To see the number of packets forwarded, look at the Pkts Fwd column on the Port Tab.

Seg Rcvd

Segments Received represents the number of segments received. This column is only applicable for TCP. If you check the Seg Rcvd checkbox, the Seg Rcvd column will be displayed.

Queue Size

Queue Size is the size of the queue that temporarily buffers packets that are being processed by a device. A device does not have to be associated with a queue. The device's queue size is defined when the device is created. If you check the Queue Size checkbox, the Queue Size column will be displayed.

Host Name

Host Name is a unique identifier that serves as the name of the computer. If you check the Host Name checkbox, the Host Name column will be displayed.

IP Address

IP Address is the IP address of a device if the device is a socket. If you check the IP Address checkbox, the IP Address column will be displayed.

Port

Port is the port number of the device if it is a socket. The port number is a string identifying the type of socket (e.g., client, listener or server) formatted as "c/l/s". If the socket is a client socket then the port number will be followed by two "/" (e.g., 6100//). If the client socket is connected to a listener socket, the listener's port number is also listed (e.g., 6100/5432/). If the socket is a server socket then the client port number that is connected to the server is listed first, followed by two "/" and the server's listener port number (e.g., 6100//7890). If the socket is a listener socket the listener's port number is listed between two "/" (e.g., /5555/). If you check the Port checkbox, the Port column will be displayed.

Protoface

Protoface is the IP transportation protocol, either TCP or UDP, of a socket device. If you check the Protoface checkbox, the Protoface column will be displayed.

Recv Pkt Rate

Receive Packet Rate represents the number of packets received in the last second. If you check the Recv Pkt Rate checkbox, the Recv Pkt Rate column will be displayed.

Max Recv Pkt Rate

Maximum Receive Packet Rate represents the maximum packet rate seen thus far. If you check the Max Recv Pkt Rate checkbox, the Max Recv Pkt Rate column will be displayed.

Recv kbit Rate

Receive kilobit Rate represents the current number of kilobits per second that are being received. If you check the Recv kbit Rate checkbox, the Recv kbit Rate column will be displayed.

Max Recv kbit Rate

Maximum Receive kilobit Rate represents the maximum kilobit rate seen thus far. If you check the Max Recv kbit Rate checkbox, the Max Recv kbit Rate column will be displayed.

Send Pkt Rate

Send Packet Rate represents the number of packets sent in the last second. If you check the Send Pkt Rate checkbox, the Send Pkt Rate column will be displayed.

Max Send Pkt Rate

Maximum Send Packet Rate represents the maximum packet rate sent thus far. If you check the Max Send Pkt Rate checkbox, the Max Send Pkt Rate column will be displayed.

Send kbit Rate

Send kilobit Rate represents the current number of kilobits per second that are being sent. If you check the Send kbit Rate checkbox, the Send kbit Rate column will be displayed.

Max Send kbit Rate

Maximum Send kilobit Rate represents the maximum kilobit rate sent thus far. If you check the Max Send kbit Rate checkbox, the Max Send kbit Rate column will be displayed.

Rcvd Pkts Drop

Received Packets Dropped represents the number of packets that TReK received and then dropped. If you check the Rcvd Pkts Drop checkbox, the Rcvd Pkts Drop column will be displayed.

Send Pkts Drop

Send Packets Dropped represents the number of packets that TReK attempted to send but dropped. If you check the Send Pkts Drop checkbox, the Send Pkts Drop column will be displayed.

Pkts Drop

Packets Dropped represents the number of packets that were dropped because they could not be processed by another device. If you check the Pkts Drop checkbox, the Pkts Drop column will be displayed.

Seg Drop

Segments Dropped represents the number of segments that TReK received and then dropped. This column is only applicable for TCP. If you check the Seg Drop checkbox, the Seg Drop column will be displayed.

Pkt Seq Err

Packet Sequence Error represents the number of packet sequence errors that occurred for a packet that is being received. A packet sequence error occurs when a packet arrives out of order (i.e. a packet with a sequence count of six was expected but instead a packet with a sequence count of seven was received). If you check the Pkt Seq Err checkbox, the Pkt Seq Err column will be displayed.

Max Pkt Seq Err

Maximum Packet Sequence Error represents the maximum packet sequence error that occurred for a packet that is being received. TReK determines the maximum packet sequence error by calculating the delta or difference between the expected packet sequence count and the actual packet sequence count. If you check the Max Pkt Seq Err checkbox, the Max Pkt Seq Err column will be displayed.

Log Statistics

If the Log Statistics checkbox is checked, a snapshot of device and packet statistics will be logged to the file and path identified.

Log File Path

The Log File Path field is used to enter the directory for the statistics log file.

Log File Name

The Log File Name field is used to enter the name for the statistics log file. A ".csv" file extension is added to the end of the filename if no file extension is provided.

Log Packet Statistics

The Log Packet Statistics checkbox is used to indicate if packet statistics information should be logged.

Set To Defaults

Set To Defaults will set all the fields to their default values.

6.3 Application Messages

Various types of application messages are generated including information, progress, warning, error, and debug messages. Information, warning, and error messages will be displayed in the main window message area. All application messages are sent to the Messages dialog shown in Figure 17. The Messages dialog can be configured to display specific types of messages. By default, the Messages dialog will display information, progress, warning, and error messages. Columns in the Messages dialog can be sorted by clicking on the column header. The Messages dialog is available from the Options menu.

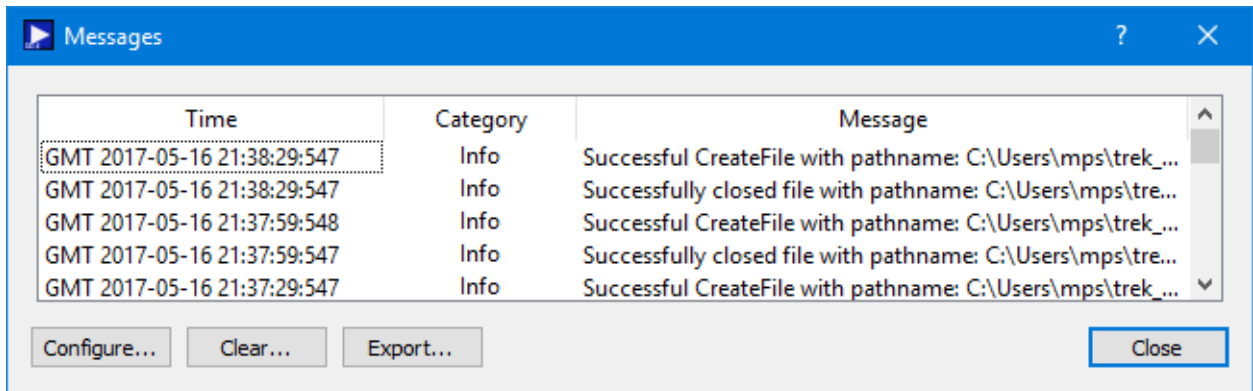


Figure 17 Messages Dialog

Configure

The Configure button provides access to the Configure Messages dialog shown in Figure 18. This dialog is used to filter the types of messages (category) displayed in the Messages dialog.

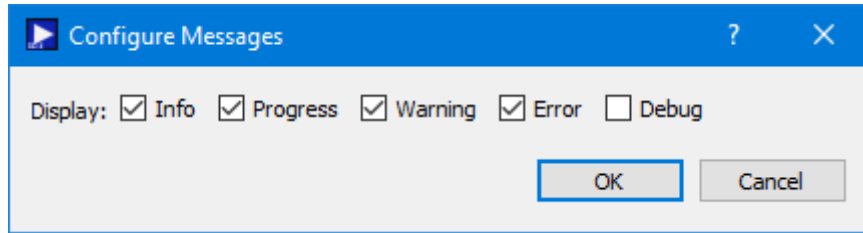


Figure 18 Configure Messages Dialog

Clear

The Clear button provides access to the Clear Messages dialog shown in Figure 19. This dialog provides two ways to clear messages in the Messages dialog. You can clear all the messages or clear selected messages. Once you clear messages, the messages are permanently deleted.

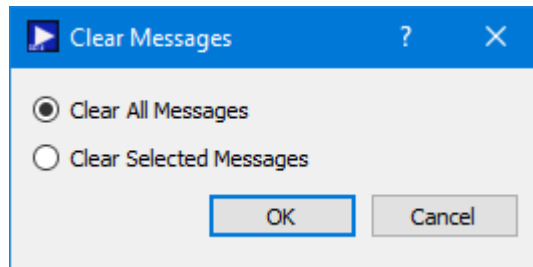


Figure 19 Clear Messages Dialog

Export

The Export button provides the capability to save all the application messages to a file. When you push the Export button you will be prompted for a directory and filename. Export will save all messages, not just the messages currently displayed in the Messages dialog (i.e. the 'Configure' filter is not applied). The name you provide for the file will be modified with a time tag appended to the filename. The time tag indicates the time the file was closed. For example:

Filename Input: messages.txt
 Filename Output: messages_2017-05-07_13~03~28.txt

6.4 Application Configuration File

The Playback application saves the following information when you save a configuration:

- Playback Configuration.

6.5 Application Settings

The Playback application saves application settings each time you exit the application. The next time you run the application, the application will initialize with the previous settings. The following settings are saved:

- Application Window Size
- Configure Messages Checkbox Selections

7 FAQ and Troubleshooting

This section addresses Frequently Asked Questions and provides tips for troubleshooting common gotchas.

No FAQs Yet.